

In the Claims:

1. (original) A method of cementing a subterranean zone penetrated by a well bore comprising the steps of:

(a) preparing or providing a cement composition having enhanced compressive strength upon setting comprising a hydraulic cement, sufficient water to form a slurry and a hydroxyamine additive selected from the group consisting of trisisopropanolamine, 1-[N,N-bis(2-hydroxyethyl)-2-amino]-2-propanol, and N,N-bis(2-hydroxypropyl)ethanolamine;

(b) placing said cement composition in said subterranean zone to be cemented; and

(c) allowing said cement composition to set into an impermeable solid mass therein.

2. (original) The method of claim 1 wherein said subterranean zone has a temperature above about 100°F and a pressure above about 1000 psig.

3. (original) The method of claim 1 wherein said hydraulic cement is selected from the group consisting of Portland cements, slag cements, pozzolana cements, gypsum cements, aluminous cements, silica cements, alkaline cements and mixtures thereof.

4. (original) The method of claim 1 wherein said hydraulic cement is Portland cement.

5. (original) The method of claim 1 wherein said water is selected from the group consisting of fresh water and salt water.

6. (original) The method of claim 1 wherein said water is present in said cement composition in an amount in the range of from about 35% to about 200% by weight of hydraulic cement therein.

7. (original) The method of claim 1 wherein said hydroxyamine additive is 1-[N,N-bis(2-hydroxyethyl)-2-amino]-2-propanol.

8. (original) The method of claim 1 wherein said hydroxyamine additive is present in said cement composition in an amount in the range of from about 0.05% to about 5% by weight of hydraulic cement therein.

9. (original) A method of cementing a subterranean zone penetrated by a well bore comprising the steps of:

(a) preparing or providing a light weight cement composition having enhanced compressive strength upon setting comprising a mixture of a standard hydraulic cement having a particle size in the range of from about 10 microns to about 20 microns and a fine hydraulic cement having a particle size in the range of from about 2 microns to about 5 microns, sufficient water to form a slurry and a hydroxyamine additive selected from the group consisting of trisisopropanolamine, 1-[N,N-bis(2-hydroxyethyl)-2-amino]-2-propanol, and N,N-bis (2-hydroxypropyl)ethanolamine;

(b) placing said cement composition in said subterranean zone to be cemented; and

(c) allowing said cement composition to set into an impermeable solid mass therein.

10. (original) The method of claim 9 wherein said subterranean zone has a temperature above about 100°F and a pressure above about 1000 psig.

11. (original) The method of claim 9 wherein said standard hydraulic cement is present in said mixture in an amount of about 35% by weight and said fine hydraulic cement is present therein in an amount of about 65% by weight.

12. (original) The method of claim 9 wherein said standard hydraulic cement and said fine hydraulic cement are selected from the group consisting of Portland cements, slag cements, pozzolana cements, gypsum cements, aluminous cements, silica cements, alkaline cements and mixtures thereof.

13. (original) The method of claim 9 wherein said standard cement and said fine cement are Portland cements.

14. (original) The method of claim 9 wherein said water is selected from the group consisting of fresh water and salt water.

15. (original) The method of claim 9 wherein said water is present in said cement composition in an amount in the range of from about 100% to about 200% by weight of hydraulic cement therein.

16. (original) The method of claim 9 wherein said hydroxyamine additive is 1-[N,N-bis(2-hydroxyethyl)-2-amino]-2-propanol.

17. (original) The method of claim 9 wherein said hydroxyamine additive is present in said cement composition in an amount in the range of from about 0.05% to about 5% by weight of hydraulic cement therein.

18. (original) A method of cementing a subterranean zone penetrated by a well bore comprising the steps of:

(a) preparing or providing a foamed cement composition having enhanced compressive strength upon setting comprising a hydraulic cement, sufficient water to form a slurry, a hydroxyamine additive selected from the group consisting of trisisopropanolamine, 1-[N,N-bis(2-hydroxyethyl)-2-amino]-2-propanol, and N,N-bis (2-hydroxypropyl)ethanolamine, sufficient gas to form a foam and an additive for foaming and stabilizing said slurry;

(b) placing said foamed cement in said subterranean zone to be cemented; and

(c) allowing said foamed cement to set into an impermeable solid mass therein.

19. (original) The method of claim 18 wherein said subterranean zone has a temperature above about 100°F and a pressure above about 1000 psig.

20. (original) The method of claim 18 wherein said hydraulic cement is selected from the group consisting of Portland cements, slag cements, pozzolana cements, gypsum cements, aluminous cements, silica cements, alkaline cements and mixtures thereof.

21. (original) The method of claim 18 wherein said hydraulic cement is Portland cement.

22. (original) The method of claim 18 wherein said water is selected from the group consisting of fresh water and salt water.

23. (original) The method of claim 18 wherein said water is present in said foamed cement composition in an amount in the range of from about 40% to about 60% by weight of hydraulic cement therein.

24. (original) The method of claim 18 wherein said hydroxyamine additive is 1-[N,N-bis(2-hydroxyethyl)-2-amino]-2-propanol.

25. (original) The method of claim 18 wherein said hydroxyamine additive is present in said foamed cement composition in an amount in the range of from about 0.05% to about 5% by weight of hydraulic cement therein.

26. (original) The method of claim 18 wherein said gas is selected from the group consisting of air and nitrogen.

27. (original) The method of claim 18 wherein said gas is present in said foamed cement composition in an amount in the range of from about 20% to about 35% by volume of said slurry.

28. (currently amended) The method of claim 18 wherein said additive for foaming and stabilizing said slurry is a mixture of an ethoxylated alcohol ether sulfate surfactant, an alkyl

or alkene amidopropyl ~~betaene~~ betaine surfactant and an alkyl or alkene amidopropyl dimethyl amine oxide surfactant.

29. (original) The method of claim 18 wherein said additive for foaming and stabilizing said slurry is present in said foamed cement composition in an amount in the range off from about 1% to about 5% by volume of water therein.

30. (original) A method of cementing a subterranean zone penetrated by a well bore comprising the steps of:

(a) preparing or providing a foamed cement composition having enhanced compressive strength upon setting comprising a hydraulic cement, a set retarder, a light weight filler, a compressive strength retrogration preventing additive, sufficient water to form a slurry, a hydroxyamine additive selected from the group consisting of trisisopropanolamine, 1-[N,N-bis(2-hydroxyethyl)-2-amino]-2-propanol, and N,N-bis(2-hydroxypropyl)ethanolamine, sufficient gas to form a foam and an additive for forming and stabilizing said slurry;

(b) placing said foamed cement composition in said subterranean zone to be cemented; and

(c) allowing said foamed cement composition to set into an impermeable solid mass therein.

31. (original) The method of claim 30 wherein said subterranean zone has a temperature above about 100°F and a pressure above about 1000 psig.

32. (original) The method of claim 30 wherein said hydraulic cement is selected from the group consisting of Portland cements, slag cements, pozzolana cements, gypsum cements, aluminous cements, silica cements, alkaline cements and mixtures thereof.

33. (original) The method of claim 30 wherein said hydraulic cement is Portland cement.

34. (canceled).

35. (original) The method of claim 30 wherein said set retarder is present in said foamed cement composition in an amount in the range of from about 0.1% to about 2% by weight of hydraulic cement therein.

36. (original) The method of claim 30 wherein said light weight filler is amorphous silica.

37. (original) The method of claim 30 wherein said light weight filler is present in said foamed cement composition in an amount in the range of from about 10% to about 20% by weight of hydraulic cement therein.

38. (original) The method of claim 30 wherein said compressive strength retrogradation preventing additive is fine crystalline silica.

39. (original) The method of claim 30 wherein said fine crystalline silica is present in said foamed cement composition in an amount in the range of from about 35% to about 70% by weight of hydraulic cement therein.

40. (original) The method of claim 30 wherein said water is selected from the group consisting of fresh water and salt water.

41. (original) The method of claim 30 wherein said water is present in said foamed cement composition in an amount in the range of from about 40% to about 60% by weight of hydraulic cement therein.

42. (original) The method of claim 30 wherein said hydroxyamine additive is 1-[N,N-bis(2-hydroxyethyl)-2-amino]-2-propanol.

43. (original) The method of claim 30 wherein said hydroxyamine additive is present in said foamed cement composition in an amount in the range of from about 0.05% to about 5% by weight of hydraulic cement therein.

44. (original) The method of claim 30 wherein said gas is selected from the group consisting of air and nitrogen.

45. (original) The method of claim 30 wherein said gas is present in said foamed cement composition in an amount in the range of from about 20% to about 35% by volume of said slurry.

46. (currently amended) The method of claim 30 wherein said additive for foaming and stabilizing said slurry is a mixture of an ethoxylated alcohol ether sulfate surfactant, an alkyl or alkene amidopropyl ~~betaene~~ betaine surfactant and an alkyl or alkene amidopropyl dimethyl amine oxide surfactant.

47. (original) The method of claim 30 wherein said additive for foaming and stabilizing said slurry is present in said foamed cement composition in an amount in the range of from about 1% to about 5% by volume of water therein.